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Inventor Name Search Result

Your Search was:

Last Name = SWIFT
First Name = DAVID C

Serial#	Patent#	Status	Date Filed	Title	Inventor Name
08339986 348/51	5502481 Lee, Michael 27/14 6A53	150	11/14/1994	DESKTOP-BASED PROJECTION DISPLAY SYSTEM FOR STEREOSCOPIC AND SCOTOPIC	SWIFT , DAVID C.
08375905 348/58	Not Issued Lee, Michael (allowed)	95	01/20/1995	INTELLIGENT METHOD AND SYSTEM FOR PRODUCING AND DISPLAYING	SWIFT , DAVID C.
08620869 348/51	Not Issued lee Michael	93	03/22/1996	PROJECTION DISPLAY SYSTEM FOR VIEWING DISPPLAYED IMAGERY OVER A WIDE	SWIFT , DAVID C.
08648215 348/56	5821989 Henry, John	150	05/15/1996	STEREOSCOPIC 3-D VIEWING SYSTEM AND GLASSES HAVING ELECTROOPTICAL	SWIFT , DAVID C.
09135896 704/270	Not Issued Zintel	30	08/18/1998	MULTI-PURPOSE INTERACTIVE APPLICATION EXECUTION SYSTEM	SWIFT , DAVID C.
09296990 359/	Not Issued not assigned	22	04/22/1999	LINE BLANKER SYSTEM	SWIFT , DAVID C.
09298070 359/46	Not Issued Chang, Audrey	30	04/22/1999	MULTI-PURPOSE VIEWING DEVICE	SWIFT , DAVID C.
60065122	Not Issued	159	11/12/1997	MULTI-PURPOSE INTERACTIVE APPLICATION EXECUTION SYSTEM	SWIFT , DAVID C.
60083298	Not Issued	159	04/28/1998	MULTI-PURPOSE VIEWING GLASSES	SWIFT , DAVID C.
60083360	Not Issued	159	04/28/1998	ENHANCEMENT TO LINE BLANKER SYSTEM	SWIFT , DAVID C.

Inventor Search Completed: No more records to search.

PRIM-EXMR: Jon W. Henry

2. 5,821,989, Oct. 13, 1998, Stereoscopic 3-D viewing system and glasses having electrooptical shutters controlled by control signals produced using horizontal pulse detection within the vertical synchronization pulse period of computer generated video signals; Gerard M. Lazzaro, et al., 348/56, 53; 359/465 [IMAGE AVAILABLE]

ABSTRACT:
The present invention relates to a system and method of viewing pairs of perspective images of 3-D objects (i.e. stereoscopic image pairs) displayed from a CRT display surface in a time-multiplexed or field-sequential manner, and more particularly to a universal method of generating control signals for synchronously changing the optical state of liquid crystal (LC) shutter panels through which the time-multiplexed perspective images can be sequentially viewed in a substantially flicker-free manner by the left and right eyes of a human viewer, independent of whether the images are displayed on NTSC, PAL, VGA or SVGA styled CRT display devices.

CLAIMS:

CLMS(1)

What is claimed is:

1. A stereoscopic 3-D image viewing system for stereoscopically viewing 3-D images displayed on a video display device responsive to a computer-generated video signal produced from a computer display adapter, said computer-generated video signal comprising a horizontal synchronization signal including horizontal synchronization pulses and a vertical synchronization signal having a vertical sychronization pulse period (VSPP), said stereoscopic 3-D image viewing system comprising:
stereoscopic viewing glasses having a pair of optical-shutters for viewing stereoscopic image pairs displayed on said video display device according to a time-multiplexing display technique, each said optical-shutter having either optically-transparent state or an optically-opaque state which is selected by a shutter control pulse signal transmitted to said stereoscopic viewing glasses; and
shutter control pulse signal generator/transmitter connectable between said computer display adapter and said video display device, receiving said computer-generated video signal as input, and generating shutter control pulse signals for use in controlling the optical state of said optical-shutters, said shutter control pulse signal generator/transmitter including
horizontal synchronization pulse detection means for detecting the number of horizontal synchronization pulses transmitted from said computer display adapter during each said vertical synchronization pulse period and producing a horizontal synchronization pulse count (HSPC) indicative thereof, and
shutter control producing means, responsive to said HSPC, for producing shutter control pulse signals for controlling the optical state of said optical-shutter viewing glasses, and
shutter control signal transmission means for transmitting said shutter control pulse signals produced from said shutter control signal producing means.

CLMS(2)

2. The stereoscopic 3-D image viewing system of claim 1, wherein said shutter control producing means comprises means for producing pulse width modulated (PGM) IR-based shutter control pulses, and said shutter control signal transmission means comprises means for transmitting said pulse width modulated IR-based shutter control pulses to said stereoscopic viewing glasses.

CLMS(3)

3. The stereoscopic 3-D image viewing system of claim 2, wherein said stereoscopic viewing glasses further comprises:
decoding circuitry for detecting the presence of pulse width modulated IR shutter control signals, recognizing a difference between two adjacent pulses therein and setting the corresponding optical state of said optical-shutters.

CLMS(4)

4. The stereoscopic 3-D image viewing system of claim 1, wherein each said optical-shutter is an LCD optical shutter.

CLMS(5)

5. The stereoscopic 3-D image viewing system of claim 1, wherein said shutter control producing means comprises:
means for producing a first shutter control pulse signal indicative of a left image being displayed when said horizontal synchronization pulse detection means produces an odd HSPC within each said vertical synchronization pulse period; and
means for producing a second shutter control pulse signal indicative of a right image being displayed when said horizontal synchronization pulse detection means produces an even HSPC within each said vertical synchronization pulse period.

CLMS(6)

6. The stereoscopic 3-D image viewing system of claim 1, wherein said shutter control producing means comprises:
means for producing a first shutter control pulse signal indicative of a right image being displayed when said horizontal synchronization pulse detection means produces an odd HSPC within each said vertical synchronization pulse period; and
means for producing a second shutter control pulse signal indicative of a left image being displayed when said horizontal synchronization pulse detection means produces an even HSPC within each said vertical synchronization pulse period.

CLMS(7)

7. The stereoscopic 3-D image viewing system of claim 1, wherein when said system is operated in a page flipped (non-interlaced) mode, said computer display adapter comprises
means for modulating the pulse width of said vertical sychronization pulse period of said vertical synchronization signal so as to encode whether a left image or a right image is being displayed on said video display device.

CLMS(8)

8. The stereoscopic 3-D image viewing system of claim 1, wherein said shutter control pulse signal generator/transmitter comprises compact housing containing said horizontal synchronization pulse detection means, said shutter control producing means, and said shutter control signal transmission means.

CLMS(9)

9. The stereoscopic 3-D image viewing system of claim 1, wherein said video display device is a CRT display device.

CLMS(10)

10. A shutter control pulse signal generator/transmitter connectable between a computer display adapter and a video display device, for receiving a computer-generated video signal as input, and generating shutter control pulse signals for use in controlling the optical state of a pair of optical-shutters employed in stereoscopic viewing glasses, said computer-generated video signal comprising a horizontal synchronization signal including horizontal synchronization pulses and a vertical synchronization signal having a vertical synchronization pulse period, and said shutter control pulse signal generator/transmitter comprising:

horizontal synchronization pulse detection means for detecting the number of horizontal synchronization pulses transmitted from said computer display adapter during each said vertical synchronization pulse period and producing a horizontal synchronization pulse count (HSPC) indicative thereof, and

shutter control producing means, responsive to said HSPC, for producing shutter control pulse signals for controlling the optical state of said optical-shutter viewing glasses, and

shutter control signal transmission means for transmitting said shutter control pulse signals produced from said shutter control signal producing means.

CLMS(11)

11. The shutter control pulse signal generator/transmitter of claim 10, wherein said shutter control producing means comprises means for producing pulse width modulated (PCM) IR-based shutter control pulses, and said shutter control signal transmission means comprises means for transmitting said pulse width modulated IR-based shutter control pulses to said stereoscopic viewing glasses.

CLMS(12)

12. The shutter control pulse signal generator/transmitter of claim 10, wherein said stereoscopic viewing glasses further comprises:

decoding circuitry for detecting the presence of pulse width modulated IR shutter control signals, recognizing a difference between two adjacent pulses therein and setting the corresponding optical state of said optical-shutters.

CLMS(13)

13. The shutter control pulse signal generator/transmitter of claim 10, wherein each said optical-shutter is an LCD optical shutter.

CLMS(14)

14. The shutter control pulse signal generator/transmitter of claim 10, wherein said shutter control producing means comprises:

means for producing a first shutter control pulse signal indicative of a left image being displayed when said horizontal synchronization pulse detection means detects an odd HSPC within each said vertical synchronization pulse period; and

means for producing a second shutter control pulse signal indicative of a right image being displayed when said horizontal synchronization pulse detection means detects an even HSPC within each said vertical synchronization pulse period.

CLMS(15)

15. The shutter control pulse signal generator/transmitter of claim 10, wherein said shutter control producing means comprises:
means for producing a first shutter control pulse signal indicative of a right image being displayed when said horizontal synchronization pulse detection means detects an odd HSPC within each said vertical synchronization pulse period; and
means for producing a second shutter control pulse signal indicative of a left image being displayed when said horizontal synchronization pulse detection means detects an even HSPC within each said vertical synchronization pulse period.

CLMS(16)

16. The shutter control pulse signal generator/transmitter of claim 10, wherein when said system is operated in a page flipped (non-interlaced) mode, said computer display adapter comprises
means for modulating the pulse width of said vertical synchronization pulse period of said vertical synchronization signal so as to encode whether a left image or a right image is being displayed on said video display device.

CLMS(17)

17. The shutter control pulse signal generator/transmitter of claim 10, wherein said shutter control pulse signal generator/transmitter comprises compact housing containing said horizontal synchronization pulse detection means, said shutter control producing means, and said shutter control signal transmission means.

CLMS(18)

18. The shutter control pulse signal generator/transmitter of claim 10, wherein said video display device is a CRT display device.

CLMS(19)

19. A method of generating shutter control pulse signals for use in controlling the optical state of a pair of optical-shutters employed in stereoscopic viewing glasses used to view stereoscopic image pairs displayed on a video display device driven by a computer-generated video signal comprising a horizontal synchronization signal including horizontal synchronization pulses and a vertical synchronization signal having a vertical synchronization pulse period, said method comprising the steps of:
(a) detecting the number of horizontal synchronization pulses transmitted during each said vertical synchronization pulse period, and producing a horizontal synchronization pulse count (HSPC) indicative thereof;
(b) in response to said HSPC produced in step (a), producing shutter control pulse signals for controlling the optical state of said optical-shutter viewing glasses; and
(c) transmitting said shutter control pulse signals to said pair of optical-shutters.

CLMS(20)

20. The method of claim 19, which further comprises:
modulating the pulse width of said vertical synchronization pulse period of said vertical synchronization signal so as to encode whether a left image or a right image is being displayed on said video display device.

ASST-EXMR: Michael H. Lee
PRIM-EXMR: Victor R. Kostak

1. 5,502,481, Mar. 26, 1996, Desktop-based projection display system for stereoscopic viewing of displayed imagery over a wide field of view; Aaron M. Dentinger, et al., 348/51, 52; 353/7; 359/458, 462 [IMAGE AVAILABLE]

ABSTRACT:
A desktop-based stereoscopic projection display system affording high-resolution stereoscopic and peripheral viewing of three-dimensional color imagery over a field of view of at least 180.degree.. The projection volume required by each image projector of the display system is disposed substantially within the overall display volume of the display system, while maximizing the viewing volume within which the viewer is free to move during interactive stereoscopic viewing sessions. The display system utilizes high-resolution image projectors, keystoning correcting optics and projection-beam folding mirrors which are compactly mounted immediately above the upper volume-boundary surface of the overall display volume of the system, in order to permit the use of three-dimensional display structures having footprints and display volumes that are supportable upon desktops and in other viewing environments characterized by spatial restrictions.

CLAIMS:

CLMS(1)

What is claimed is:

1. An image display system for simultaneously displaying a plurality of optical images of a three-dimensional object taken from a plurality of viewing directions defined relative to said three-dimensional object, said image display system comprising:
a three-dimensional display surface of generally concave geometry and electrically-passive construction, said three-dimensional display surface having
at least first and second display surface regions in spatially contiguous relation to each other,
an upper edge surface bordering at least a portion of said first display surface region,
a lower edge surface bordering at least a portion of said second display surface region,
a first side edge surface bordering at least said first display surface region, and
a second side edge display surface bordering at least said second display surface region,
wherein
said upper edge surface defines an upper volume-boundary surface,
said lower edge surface defines a lower volume-boundary surface,
said first and second edge surfaces define a front volume-boundary surface, and
said upper and lower volume-boundary surfaces, said front volume-boundary surface and said three-dimensional display surface collectively circumscribe a three-dimensional display volume disposed in the direction of the concavity of said three-dimensional display surface;
first image signal generation means for generating a first electrical signal representative of a first optical image of said

three-dimensional object viewed along a first viewing direction;

second image signal generation means for generating a second electrical signal representative of a second optical image of said three-dimensional object viewed along a second viewing direction;

first optical image producing means, fixedly disposed adjacent said upper volume-boundary surface and responsive to said first electrical signal, for generating said first optical image and projecting said first optical image onto said first display surface region of said three-dimensional display surface such that the light rays emanating from said first optical image producing means towards said first display surface region are generally confined within a first image projection volume substantially spatially encompassed within and stationarily fixed relative to said three-dimensional display volume; and

second optical image producing means, fixedly disposed adjacent said upper volume-boundary surface and being responsive to said second electrical signal, for generating said second optical image and projecting said second optical image onto said second display surface region of said three-dimensional display surface such that light rays emanating from said second optical image producing means towards said second display surface region are generally confined within a second image projection volume substantially spatially encompassed within and stationarily fixed relative to said three-dimensional display volume,

whereby a viewer supported in the direction of the concavity of said three-dimensional display surface is free to view said first and second projected optical images from anywhere within a three-dimensional viewing zone being spatially encompassed within and stationarily fixed relative to said three-dimensional display volume, and substantially free of projected light rays emanating from said first and second image projection means towards said first and second display surface regions, respectively.

CLMS(2)

2. The image display system of claim 1, wherein said said first and second display surface regions each have a planar surface geometry.

CLMS(3)

3. The image display system of claim 2, wherein said upper edge has a piece-wise rectilinear geometry and said upper volume-boundary surface has a planar surface geometry.

CLMS(4)

4. The image display system of claim 3, wherein said lower edges has a piece-wise rectilinear geometry and said lower volume-boundary surface has a planar surface geometry.

CLMS(5)

5. The image display system of claim 4, wherein said first and second side edges each have a rectilinear geometry and said front volume-boundary surface has a planar geometry.

CLMS(6)

6. The image display system of claim 1, wherein said three-dimensional display surface is smooth over its entire spatial extent.

CLMS(7)

7. The image display system of claim 1, wherein said first optical image producing means comprises

a first light source for producing visible light,

a first programmable spatial light mask for spatial filtering said produced light from said first light source in accordance with said first electrical signal so as to produce said first optical image, and

a first light projecting means for projecting said first optical image onto said first display surface region; and

wherein said second optical image producing means comprises

a second light source for producing visible light,

a second programmable spatial light mask for spatial filtering said produced light from said second light source in accordance with said second electrical signal so as to produce said second optical image, and

a second light projecting means for projecting said second optical image onto said second display surface region.

CLMS(8)

8. The image display system of claim 7, wherein said first programmable spatial light mask comprises a first LCD panel, and said second programmable spatial light mask comprises a second LCD panel.

CLMS(9)

9. The image display system of claim 1, wherein said first light projecting means comprises a first reflective surface disposed stationarily with respect to said three-dimensional display surface, and wherein said second light projecting means comprises a second reflective surface disposed stationarily with respect to said three-dimensional display surface.

CLMS(10)

10. The image display system of claim 1, which further comprises a upper surface covering means, fixedly with respect to said three-dimensional display surface, for covering said first and second optical image producing means.

CLMS(11)

11. The image display system of claim, wherein said three-dimensional display surface comprises an inflatable structure having a light reflective surface.

CLMS(12)

12. The image display system of claim 1, wherein said first and second signal generation means comprises a computer-based system programmed for generating said first and second electrical signals.

CLMS(13)

13. The image display system of claim 1, wherein said first and second signal generation means comprises an electro-optical camera system having means for generating said first and second electrical signals.

CLMS(14)

14. The image display system of claim 1, wherein said first optical image is a first polarized spatially multiplexed image of said three-dimensional image taken along said first viewing direction, and wherein said second optical image is a second polarized spatially multiplexed image of said three-dimensional image taken along said second viewing direction, and said three-dimensional display surface is a light reflective surface with polarization-preserving properties.

CLMS(15)

15. The image display system of claim 14, which further comprises a pair of electrically-passive polarizing spectacles for viewing of said first and second polarized spatially multiplexed images projected onto said first and second display surface regions, respectively.

CLMS(16)

16. The image display system of claim 1, wherein said three-dimensional display surface is supportable on a substantially planar surface selected from a group consisting of a desktop, a support base and a floor surface.

CLMS(17)

17. The image display system of claim 1, wherein said three-dimensional volume has a volumetric capacity on the order of less than about 35 cubic feet.